987914073 ID: 88072901

QK
495
.F14
L58
1991

Literature Review of

Shinnery Oak Treatments

Sand shinnery oak (Quercus havardii) is a native, perennial oak species inhabiting sandy soils of the Roswell Resource Area (RRA). It grows on 1.2 million ha (3 mill. ac.) of rangeland in Texas, 0.4 million ha (1 mill. ac.) in Oklahoma, and 1.1 million ha (2.75 mill. ac.) in New Mexico (1).

Shinnery reproduces by seed (acorn) and vegetatively by underground rhizomes. Adult plants are 1 to 3 ft. tall with occasional taller hybrid plants. (2) They often form mottes, and in extreme cases the mottes can grow together to form a solid thicket of continuous shinnery. In the RRA, shinnery should comprise about 12% by weight of the vegetative community if in excellent condition (3). However, in postclimax communities in the RRA it can comprise up to 77% of the community by weight. (4).

Moisture is often the limiting factor for plant growth in the RRA, but shinnery is capable of overcoming this by having a root/shoot ratio of 11 to 1. (2) Shinnery rhizomes are also capable of absorbing water. This gives them a competitive edge during dry springs because other plants cannot store water.(5) As a result, dense stands of shinnery can reduce forage production by as much as 90% (2).

Tebuthiuron is a substituted urea herbicide which is applied in solid, pellet form. The use of tebuthiuron by the BLM has been analyzed in the vegetation treatment EIS (6). Tebuthiuron defoliates oak...

> ...cyclically with defoliation and regrowth associated with precipitation events. Little regrowth occurred after leaf drop unless either the soils were wet or an appreciable amount of precipitation was received. New leaves then developed rapidly, but before they were fully expanded, phytotoxic symptoms appeared. Maximum herbicidal effects on oak occurred when soils were wet and when climatic conditions favored high transpiration rates.(1)

As the shinnery topgrowth dies, rhizome buds break dormancy and defoliate. (1) Variability in mortality of shinnery is dependent on skill of applicator while applying the herbicide, the rate of

BLM authors

herbicide, and sand depth (1).

At 0.5 lb/ac, tebuthiuron has little effect on grass species but may affect some forbs in the short term. "Grass yields on all treated plots had increased by three to nine times at 2 years after herbicide application. Very few grasses or forbs could be observed on untreated plots, because of small stature and low vigor. As soon as the sand shinnery oak declined, grasses and forbs to 1 m tall were common in all plots."(7) The number of forb species and the amount of forb production increases within three years after treatment (5).

Reduction of shinnery after treatment allows other plant species to utilize soil moisture. This results not only in increased production of these species, but also an increase in nutritional value of treated areas. Grasses in treated areas have been observed to green up 3 weeks earlier than those on untreated areas (8). This same study also noted an increase in crude protein as well as water content in grasses in the treated plots. Drought-induced quiescence occurs up to 6 weeks earlier on untreated vs. treated areas (1). These nutritional factors can be critical during a drought, especially for those livestock and wildlife that are lactating at that time.

Treatment of shinnery communities reduces soil erosion. Untreated areas have twice as much bare ground as treated plots 30 months after treatment (9). On sandy areas, wind erosion tends to cause more soil loss than water erosion. After treatment, there is an increase in height and production of herbaceous species. By increasing air turbulence as it moves across the soil, wind energy is lost and erosion reduced. Range conservationists of RRA have noticed a gradual leveling of sand dunes and hummocks on treated areas (10).

Economic analysis by Texas Tech University shows treatment at 0.5 lb/acre to be profitable with a treatment life of 15 years. (5)

(1) "Low Rates of Tebuthiuron for Control of Sand Shinnery Oak" by V.E. Jones and R.D. Pettit. Journal of Range Management (JRM) November, 1984.

(2) "Herbicide Conversion of a Sand Shinnery Oak (Quercus havardii) Community: Effects on Biomass" by W.E. Sears, C.M. Britton, D.B. Wester, and R.D. Pettit. JRM September 1986.

(3) Range Site Description for Deep Sand CP-2. USDA, Soil Conservation Service, NM MLRA G70-63-N. July, 1978.

(4) Production data from allotment 5043 - South Meadows Pasture. U.S. DOI, Bureau of Land Management. December, 1984.

(5) "Sand Shinnery Oak: Control and Management" by Russell D. Pettit. Publication of College of Agricultural Sciences of Texas Tech University.

(6) "Final Environmental Impact Statement, Vegetation Treatment in Thirteen Western States", prepared by U.S. DOI, Bureau of Land Management. May 1991.

(7) "Effects of Picloram and Tebuthiuron Pellets on Sand Shinnery Oak Communities" by R.D. Pettit. JRM May 1979.

(8) "Nutritive Value of Forages on Sandy Soils as Affected by Tebuthiuron" by Mario Biondini, R.D. Pettit, and Virgil Jones. JRM September 1986.

(9) "Vegetational Responses Following Control of Sand Shinnery Oak with Tebuthiuron" by P.W. Jacoby, J.E. Slosser, and C.J. Meadors. JRM July 1983.

(10) Photo monitoring of Allotment 5051. U.S. DOI, Bureau of Land Management.

BLM Library
Denver Federal Center
Bldg. 50, OC-521
P.O. Box 25047
Denver, CO 80225